

ABSTRACT

A noise-canceling microphone system suitable for use in small telephonic devices such as cellular "flip" telephones has one or more acoustic transmission lines embedded in the flip component through openings in the distal end of the flip component, and coupled to a microphone element carried by the main housing. The acoustic transmission lines have boots coupled to the microphone element to accommodate the swiveling action of the flip component. In a critical aspect of the present invention, the microphone assembly incorporated in a communication device has acoustic transmission tubes containing acoustic impedance elements matched to the specific acoustic characteristic resistance of the tubes to eliminate standing waves and thus resonances in the microphone frequency response. For all Zero-Order Gradient, First-Order Gradient and Second-Order Gradient microphone systems, the specific acoustic characteristic resistance of the acoustic transmission tubes are matched, and hence the phase and time delays of acoustic waves propagating therethrough are made to be proportional to the tube lengths by including impedance elements.